



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/933,053	08/20/2001	Rolf Heinemann	SBV-07699	6719
24131	7590	03/22/2004	EXAMINER	
LERNER AND GREENBERG, PA P O BOX 2480 HOLLYWOOD, FL 33022-2480			FULLER, ERIC B	
			ART UNIT	PAPER NUMBER
			1762	

DATE MAILED: 03/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/933,053

Applicant(s)

HEINEMANN ET AL

Examiner

Eric B Fuller

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 24, 2004 has been entered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3-7, 10, and 13-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Bady et al. (US 6,303,897 B1).

Bady teaches a method of cladding the interior of a cylinder crankcase. The probe comprising a laser and powder feeder taught in column 2, lines 37-51, and column 3, lines 15-38, read on the applicant's arrangement and optics. The additional

Art Unit: 1762

laser treatment is read on in column 4, lines 15-25. The coating comprises a silicon component (column 2, lines 25-30). The penetration depth laser energy is taught in column 1, lines 45-60, and column 2, lines 52-60.

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8, 9, 11, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bady et al. (US 6,303,897 B1).

Bady teaches the limitations shown above. The reference is silent to the thickness of the coating applied and the number of passes of the deposition apparatus that is required to achieve this thickness. However, it would have been within the skill of one practicing in the art, through routine experimentation, to determine the thickness required to achieve proper wear resistance of the coating. It also would have been within the skill of one practicing in the art to determine the number of passes of the coating apparatus are required in order to achieve this thickness.

Claims 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kramer et al. (US 5,080,056) in view of Sailer et al. (US 5,644,828) and Hammeke (US 4,724,299), and further in view of Pfeffinger et al. (US 6,221,504 B1).

Kramer teaches alloying and coating the interior walls of cylinder bores with a wear resistant material (column 2, lines 12-16) by thermal spraying (column 2, lines 17-29). Kramer further teaches that the powder material used for coating/alloying is an aluminum/silicon alloy (column 4, line 7). The coating is deposited onto and alloyed into the substrate. The reference cited examples of plasma spraying and arc spraying as suitable forms of thermal spraying, but does not limit the invention to such. However, the reference fails to explicitly teach laser spraying as a suitable form of thermal spraying.

Sailer teaches that plasma spraying, arc spraying, and laser spraying are all equivalent forms of thermal spraying. Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize laser spraying as the method of thermal spraying in Kramer with a reasonable expectation of similar results, as Sailer teaches equivalence. However, Sailer fails to teach how the method of laser spraying is performed.

Hammeke teaches a method of laser spraying wherein the coating powder is fed through a laser apparatus such that the apparatus may be used to coat complexly shaped substrates uniformly and quickly (column 5, lines 17-25). The powder is fed coaxially with the laser beam and is converged on a common focal point with the laser

Art Unit: 1762

beam that creates a melt pool in the substrate (column 2, lines 15-20). One of ordinary skill would recognize that since the powder stream and laser are one elongated device, such an arrangement would be ideal for fitting into the small diameters bores of Kramer. Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize a laser spraying method such as that taught by Hammeke in order to form the alloy/coating of Kramer. By doing so, one would have a reasonable expectation of success, as Sailer teaches the equivalence of laser spraying with other forms of thermal spraying. Modifications to the apparatus of Hammeke so that the inner wall of a cylinder is coated as opposed to an area directly below the nozzle, such as deflecting the laser beam and powder streams towards the wall, are all within the skill of one practicing in the art when taken in view of figure 2A of Kramer.

The above-cited references fail to explicitly teach using an additional laser treatment in order to deposit oil pockets. However, Pfeffinger teaches that additional thermal spraying treatments may be used to deposit lubricants into the interior walls of cylinder bores in order to increase the tribological characteristics of the coating (column 3, lines 35-40; abstract). Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to use additional thermal spraying treatments in Kramer in order to deposit oil pockets such that the tribological characteristics of the coating/alloy is increased. For the same reasons as above, to use laser spraying as the thermal spraying means would have been obvious with the expectation of achieving similar results, as taught by Sailer.

Claims 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kramer et al. (US 5,080,056) in view of Sailer et al. (US 5,644,828) and Hammeke (US 4,724,299) and Pfeffinger et al. (US 6,221,504 B1), as applied to claims 13 and 15 above, and further in view of Beyer et al. (US 6,197,386 B1).

The above-cited references are used for teaching the limitations of claims 13 and 15, but they fail to teach the use of mirrors to direct the laser beam to the inner wall of the substrate. However, Beyer teaches the use of a mirror in order to deflect a laser beam such that it hits a desired location on a substrate (figure 1, reference 4). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use a mirror to deflect the laser beam. By doing so, the laser beam is directed to the desired location.

Claims 1 and 4-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishimura et al. (US 5,912,057) in view of Hammeke (US 4,724,299).

Nishimura teaches a method of cladding the interior of a cylinder crankcase by simultaneously directing a laser and powder spray at the same location inside the cylinder (column 3, lines 1-24). The overlayer reads on the additional laser treatment (column 3, lines 25-35). The coating comprises a nickel component (column 5, lines 1-10). The reference fails to explicitly teach having the powder to sprayed through the laser. However, Hammeke teaches a method of laser spraying wherein the coating powder is fed through a laser apparatus such that the apparatus may be used to coat complexly shaped substrates uniformly and quickly (column 5, lines 17-25). The

Art Unit: 1762

powder is fed coaxially with the laser beam and is converged on a common focal point with the laser beam that creates a melt pool in the substrate (column 2, lines 15-20). One of ordinary skill would recognize that since the powder stream and laser are one elongated device, such an arrangement would be ideal for fitting into the small diameters bores of Nishimura. Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize a laser spraying method such as that taught by Hammeke in order to form the alloy/coating of Nishimura. By doing so, one would reap the benefits of forming the coating uniformly and quickly. Modifications to the apparatus of Hammeke so that the inner wall of a cylinder is coated as opposed to an area directly below the nozzle, such as deflecting the laser beam and powder streams towards the wall, are all within the skill of one practicing in the art. As the spray apparatus is rotated, as is taught by Nishimura, so is the laser, as they are one unit.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishimura et al. (US 5,912,057) in view of Hammeke (US 4,724,299), as applied to claim 1, and further in view of Pfeffinger et al. (US 6,221,504 B1).

The above-cited references fail to explicitly teach using an additional laser treatment in order to deposit oil pockets. However, Pfeffinger teaches that additional thermal spraying treatments may be used to deposit lubricants into the interior walls of cylinder bores in order to increase the tribological characteristics of the coating (column 3, lines 35-40; abstract). Therefore, it would have been obvious at the time the

invention was made to a person having ordinary skill in the art to use additional thermal spraying treatments in Nishimura in order to deposit oil pockets such that the tribological characteristics of the coating/alloy is increased. As Nishimura is the primary reference and uses a laser as the thermal means, to use the all ready present laser to deposit the dry lubricant would have been obvious with an expectation of success, as laser spraying is a form of thermal spraying.

Response to Arguments

Applicant argues that the prior rejections failed to make obvious the positioning and motion of the laser. Applicant's arguments are persuasive with respect to claims 1 and 3-12 and the examiner has withdrawn these rejections, based on the Kramer, accordingly. However, claims 13-16 do not have limitations drawn to positioning and motion of the laser. It is the position of the examiner that the rejections of these claims, based on Kramer, are still applicable, as they do not require the laser being coaxial to the cylinder and being rotated about a longitudinal axis. Limitations such as providing beam deflection would have been within the knowledge of one practicing in the art when making the necessary modifications for directing the spray and laser towards the cylinder wall. It is the position of the examiner that one of ordinary skill in the art, having a degree in engineering and a knowledge of optics, would know to at least use a mirror to deflect a laser towards an area that the primary reference teaches requires a laser beam.

Applicant argues that the apparatus of Hammeke is stationary and give reasons on how motion of the laser would not be possible. This argument does not pertain to claims 13-16, as motion is not required. In so far this argument pertains to Hammeke as it is now applied to claims 1 and 3-12, the primary reference requires motion of the *spray device* and a laser directed in the same location as the spray. Hammeke teaches an apparatus that is beneficial for various reasons indicated above. To use this device to supply the laser beam and spray would have been obvious, as shown above. In combining the two references, it would have been obvious to rotate the entire spray apparatus, as the primary reference requires. The laser would accordingly be rotated, reading on the applicant's claim. The arguments the applicant has provided on why Hammeke cannot be rotated only show that independent parts of the apparatus may not be rotated (such as the sprayer separate from laser or the tip from the rest of the body), thus requiring that the entire apparatus be rotated. This further supports the examiners position. One of ordinary skill, having the ingenuity of an engineer would have the knowledge to apply the motion required by the primary reference with the apparatus of Hammeke.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Feikus (US 2002/0153359 A1) and Morishige et al. (US 5,387,292) are cited for being pertinent to the applicant's disclosure.

Art Unit: 1762

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric B Fuller whose telephone number is (571) 272-1420. The examiner can normally be reached on Mondays through Thursdays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P Beck, can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



EBF



MICHAEL BARR
PRIMARY EXAMINER